The places of the stars are the apparent places for the time of comparison with the comet.

Prof. Bache also reported the following occultations of fixed stars by the Moon, observed by Prof. Rümker in Hamburg.

| 1840. | Star. | Phase. | Mean Time at Hamburg. |
|---|---|---|---|
| April 11 | $\gamma$ Leonis | Immers. | 10 34 58.29 |
| 22 | $\tau$ Sagittarii | Immers. | 16 13 20.77 |
| May 4 | Anon. | Immers. | 10 30 16.97 |
| June 3 | $\nu$ Cancri | Immers. | 9 48 30.98 |
| Aug. 24 | * Cancri | Immers. | 16 13 35.8 |
| | * Cancri | Immers. | 16 16 7.9 |

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*Stated Meeting, December* 4.

Present, thirty members.

Mr. Du Ponceau, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

A History of the United States before the Revolution; with some Account of the Aborigines. By Ezekiel Sandford. 8vo. Philadelphia, 1819.—*From Mr. Du Ponceau.*

The Resources of the United States of America; or a View of the Agricultural, Commercial, Manufacturing, Financial, Political, Literary, Moral, and Religious Capacity and Character of the American People. By John Bristed, Counsellor at Law, &c. &c. 8vo. New York, 1818.—*From the same.*

History of the late Polish Revolution, and the Events of the Campaign. By Joseph Hordynski, Major of the late 10th Regiment of Lithuanian Lancers. 8vo. Boston, 1832.—*From the same.*

Memoirs of Goethe, written by himself. 8vo. New York, 1824.—*From the same.*

The History of the Administration of John Adams, Esq., late President of the United States. By John Wood, Author of the History of Switzerland, &c. 8vo. New York.—*From the same.*

The Political Mirror: or Review of Jacksonism. 12mo. New York, 1835.—*From the same.*

The Proceedings and Resolutions of the West India Body, including Copies of their various Communications with His Majesty's Government, relative to the Measures of the Session of 1833, for the Abolition of Slavery. Small Folio. 1833.—*From Mr. Petty Vaughan.*

A Pictorial Geography of the World, comprising a System of Universal Geography, Popular and Scientific, &c. &c., illustrated by more than One Thousand Engravings of Manners, Costumes, Curiosities, Cities, Edifices, Ruins, Beasts, Birds, &c. &c., with a Copious Index, answering the purpose of a Gazetteer. By S. G. Goodrich. Second Edition. 2 Vols. Large 8vo. Boston, 1840.—*From the Author.*

Specimens of an Improved Metrical Translation of the Psalms of David, intended for the Use of the Presbyterian Church in Australia and New Zealand, with a Preliminary Dissertation, and Notes Critical and Explanatory. By John Dunmore Lang, D.D., Senior Minister of the Presbyterian Church in Communion with the Church of Scotland in New South Wales.—*From the Author.*

Report from the Select Committee on Lighting the House (of Commons); together with the Minutes of Evidence, Appendix, and Index. Fol. Aug. 1839.—*From Mr. H. C. Carey.*

Report to the Controllers of the Public Schools, on the Reorganization of the Central High School of Philadelphia. By A. D. Bache, LL.D., President of the Girard College for Orphans. 8vo. Philadelphia, 1839–40.—*From the Author.*

Report on the Organization of a High School for Girls, and Seminary for Female Teachers. 8vo. Philadelphia, 1840.—*From the same.*

The Committee, consisting of Mr. Richards, Dr. Ludlow, and Mr. G. M. Wharton, on a communication of Professor Forshey, of Natchez, containing a description of the great Mound near Washington, Adams County, Mississippi, reported favourably of the same, and expressed the hope, that the author might be enabled to prosecute farther examinations, "the result of which, with his enlightened commentaries, would furnish a most acceptable addition to the Transactions of the Society."

The Mound, described by Professor Forshey, is found about nine miles north-east from the city of Natchez, Mississippi, upon the most elevated portion of that comparatively low and level region. It is approached on all sides by a slope. The elevation of its base above the mean level of the waters of the Mississippi, at Natchez, is estimated at 265 feet, and the greatest height of the Mound above the earth, 84 feet. The whole elevation above the waters of the river 348 feet, giving to the spectator a clear horizon of 150 degrees, embracing, in that flat region, a rich and extended prospect.

The Mound is an irregular artificial elevation of earth, varying, in its general line, from 40 to 46 feet in height, and encloses an area of about seven acres inclusive of the ground covered by its base. On the surface of the general Mound are erected, at irregular intervals, 15 smaller Mounds, one of which is 38 feet in height, and the remaining 14 varying from 4 to 12 feet in height. The Mound consists of clay, with some admixture of earth, and its sides seem to have been faced with rudely formed brick, made from the adjacent clay. The bricks are found after digging to the depth of some 12 or 15 inches into the embankment. The western front is ascended by two causeways, which are distinctly marked, and are found one at each angle of the Mound. At the eastern extremity is another causeway entrance to the enclosure, and near to this entrance, and outside the embankment, may be traced, for some distance, an ancient fosse. The three causeways are of easy ascent, and wide enough for the introduction of burthens. Upon the north and south sides of the great Mound, and at points nearly opposite to each other, covered entrances or archways were constructed, but they are now so obstructed as to be difficult of examination. Before the forest was cleared by civilized culture, tradition relates that extensive avenues reached north, south, east, and west, thus affording, from the elevation of the great Mound, a most attractive prospect.

The result, of the partial examinations made, shows that portions of the Mound were used as places of interment by the Indians. The cranium secured by Prof. Forshey was of the tribe of Flatheads.

Earthen vessels of rude construction, and probably used frequently as receptacles for the remains of those interred, or as mementos at their funeral obsequies, are found. Various objects from the Mound have reached the Lyceum at Natchez.

The Committee, consisting of Mr. Lea, Dr. Hays, and Mr. Ord, to whom was referred a communication, entitled "Re-

marks on the Dental System of the Mastodon, with an Account of some Lower Jaws in Mr. Koch's Collection, St. Louis, Missouri, where there is a Solitary Tusk on the Right Side, by William E. Horner, M.D., Professor of Anatomy in the University of Pennsylvania," reported in favour of the publication, which was directed accordingly.

Dr. Horner inquires into the mode of formation of the teeth of the Mastodon, and compares it with that of the elephant and of man. The teeth of the Mastodon are all formed upon one type of configuration, the number of denticules excepted; they therefore, like those of the elephant, do not admit of a division into incisors, cuspidati, and molares, as in some other animals. The teeth are all molars. The lower jaw itself resembles somewhat a human lower jaw cut off in front of the molar teeth, and then joined in the two posterior segments. These teeth invariably succeed each other from behind; the hindmost, as they emerge, pushing the others forward, and out of their places, until the latter all drop out, and a large solitary tooth is finally left on each side of each jaw.

Dr. Horner alludes to the erroneous nature of the early ideas of naturalists on the teeth of the Mastodon, and observes that we now know, with some degree of certainty, that the earliest teeth of this animal were not more than an inch and a half square, and that the three immediately succeeding were a gradual and successive enlargement on this and on each other's volume. In the Museum of Mr. Koch, at St. Louis, there is a young head, the long diameter of which is 18 or 20 inches, where the fact of four co-existent teeth on each side of each jaw is exhibited. This specimen, with a dozen lower jaws of different ages and sizes, enables us to trace, with some accuracy, the stages of dentition, until it reaches the large and solitary grinder of ten inches in length on each side. Judging from these phases of dentition, Dr. Horner infers that the entire amount of teeth was at least 24; he is disposed, indeed, to think that the number may have been greater than this; perhaps 28, and possibly 32.

Dr. Horner makes some observations on some specimens of lower jaws in Mr. Koch's Museum in St. Louis, in which there was a solitary tusk on the right side, and alludes to the embarrassments that their existence occasions in regard to the Tetracauledon of Godman; whether, for example, we are to consider them merely as abnormous types of that animal, as known Mastodons, or as still another species

to which, if such, the name Tetracauledon might be attached. Dr. Horner confesses himself unable to suggest a probable solution of these questions, and states, in connection with them, that Mr. Koch has the lower part of the head of a Mastodon of middling size, in which, from the intermaxillary bone, as usual, protrudes a tusk, which measures thirty inches long by four inches in diameter; but the tusk exists only on the left side, there being not even a vestige of alveolus on the right.

It is very far from being certain, Dr. Horner adds, that any example exists of the upper jaw of the Tetracauledon; the presence of tusks in both jaws at once has therefore to be yet proved.

The Committee, consisting of Prof. Bache, Dr. Patterson, and Mr. Lukens, to whom was referred the paper, entitled "Observations to determine the Magnetic Intensity at several Places in the United States, with some additional Observations of the Magnetic Dip, by Elias Loomis, Professor of Mathematics and Natural Philosophy in Western Reserve College," recommended the same for publication in the Society's Transactions, which was ordered accordingly.

The following is an abstract of the results of observations contained in this memoir.

1. *Magnetic Intensity.*—The horizontal intensity was observed by an apparatus similar to the one used by Professor Hansteen. Three small needles furnished to the author by Professor Renwick, and made under the direction, respectively, of Professor Hansteen, Major Sabine, and Professor Henry, were employed. The commencing semi-arc of vibration was, in every case, 30°, and each series included 320 oscillations, the instant of the completion of every tenth vibration being noted. No correction, therefore, is applied for the arc of vibration. The times were observed at Dorchester, Princeton, and Philadelphia, by a chronometer, and at the other stations by a lever watch, which, at Hudson, was compared with the observatory clock before and after the observations. The author remarks, that "at the remaining stations there is a little uncertainty with regard to the time, yet it is thought its influence upon the results will not be great."

The correction for temperature, for each of the needles, was obtained by direct experiment, and gave the following coefficients:—

For the Hansteen needle, .000191; for the Sabine needle, .000328; for the Henry needle, .000116. The results of observation are reduced to a standard temperature of 60° Fah.

The author gives the reasons which induce him to apply no correction for the change of magnetism in the needles. The observations for horizontal intensity were principally made in September and November, 1839.

The stations of observation at different places were the same as formerly described (Am. Phil. Soc. Trans.), except at Dorchester, which was near Mr. Bond's Observatory. The details of the observations are given, and from the mean of those for horizontal intensity, combined with the dips formerly observed, the author gives the total intensities, taking New York as 1.803, according to the determination of Major Sabine, and referring to the unit established by Humboldt, as follows:—

| | Horizontal Intensity. | Dip. | Total Intensity. |
|---|---|---|---|
| New York, | .96707 | 72° 52.2′ | 1.803 |
| New Haven, | .92364 | 73 26.7 | 1.780 |
| Dorchester, | .88182 | 74 16.0 | 1.786 |
| Providence, | .89830 | 73 59.6 | 1.789 |
| Princeton, | .97414 | 72 47.1 | 1.807 |
| Philadelphia, | 1.00000 | 72 07.0 | 1.788 |
| Hudson, | .97344 | 72 47.6 | 1.807 |

The author remarks that Hudson, Ohio, and New York, thus appear to have sensibly the same magnetic dip and intensity. He concludes this part of his memoir with a comparison of his intensity observations with those of Professors Bache and Courtenay.

2. *Magnetic Dip.*—This section commences with an account of observations of the magnetic dip, made at Hudson, Ohio, in different azimuths, to try the figure of the axles of the dipping needles. The results for needle No. 1 were quite satisfactory, and for needle No. 2, showed a difference in the extremes of 12.7′: upon a review of the whole, the author considers them as justifying confidence in the needles used.

The following determinations of the dip are next given:—

| | | Latitude. | Longitude. | Date. | Magnetic Dip. |
|---|---|---|---|---|---|
| Hudson, | Ohio, | 41° 15′ N. | 81° 26′ W. | April 15, 1840 | 72° 53′.2 |
| Aurora, | „ | 41 20 | 81 20 | Sept. 8, „ | 72 55.5 |
| Windham, | „ | 41 15 | 81 03 | „ 8, „ | 73 03.4 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Bazetta, | „ | 41 | 20 | 80 | 45 | Sept. 9, 1840, | 72 | 59.7 |
| Kinsman, | „ | 41 | 30 | 80 | 34 | „ 10, „ | 73 | 08.1 |
| Hartford, | „ | 41 | 19 | 80 | 34 | „ 10, „ | 72 | 59.8 |
| Warren, | „ | 41 | 16 | 80 | 49 | „ 11, „ | 73 | 00.7 |
| Cleveland, | „ | 41 | 30 | 81 | 42 | „ 22, „ | 73 | 12.0 |
| Bedford, | „ | 41 | 24 | 81 | 32 | „ 23, „ | 72 | 58.0 |
| Twinsburgh, | „ | 41 | 20 | 81 | 26 | „ 23, „ | 72 | 51.3 |
| Tallmadge, | „ | 41 | 06 | 81 | 26 | „ 28, „ | 72 | 50.1 |
| Shalersville, | „ | 41 | 15 | 81 | 13 | Oct. 15, „ | 72 | 56.6 |
| Streetsboro', | „ | 41 | 15 | 81 | 20 | „ 16, „ | 72 | 53.0 |
| Tallmadge, | „ | 41 | 06 | 81 | 26 | „ 31, „ | 72 | 48.2 |

Dr. Patterson, from the Observatory Committee, laid before the Society the following Ordinance, passed by the City Councils on the 19th of November last.

"An Ordinance to authorize the American Philosophical Society to erect an Observatory in Rittenhouse Square.

SECT. 1. *Be it ordained and enacted by the Citizens of Philadelphia in Select and Common Councils assembled*, That the American Philosophical Society be and they are hereby authorized to erect, at their expense, an Observatory in Rittenhouse Square, the same to be built under the supervision of the Committee on City Property, and after a plan to be approved by them; subject, nevertheless, to the right of the Mayor, Aldermen, and Citizens of Philadelphia, to prescribe regulations for the government and management thereof, and at any time the Select and Common Councils may deem it expedient, to take possession of and remove the said building from the said square."

Signed by the Presidents of the Select and the Common Council.

Whereupon it was resolved, that the terms of the Ordinance be accepted by the Society, and that the Observatory Committee be instructed to take the necessary measures, under the powers given them, for carrying the objects of the Ordinance into effect.

Mr. Walker read a communication, entitled "Researches concerning the Periodical Meteors of August and November, by Sears C. Walker," which was referred to a Committee.

Prof. Bache brought before the Society an instrument for measuring the changes in the vertical components of the force

of terrestrial magnetism, which he described as combining the principles of the vertical force instrument of Prof. Lloyd, with that of reflection adopted in the magnetometers of Prof. Gauss, and which had been made for him by Mr. Saxton.

Prof. Bache stated, that having found difficulties in the use, especially by his assistants, of the vertical force instrument invented by Prof. Lloyd, and made for the Magnetic Observatory at the Girard College, by Robinson, of London, he had applied, in June last, to Mr. Saxton, to construct the instrument now presented to the notice of the Society. The details had been matured by conference with Mr. Saxton. The magnetic bar, placed and supported as in the instrument of Prof. Lloyd, carries a mirror upon its axis. The mode of adjusting the position of the centre of gravity of the needle does not differ materially from that adopted in the instrument referred to. The needle is raised off the agate planes by the action of a screw, raising a bar which supports two small cups adapted to receive two projecting pins on the arms of the magnet. This magnetometer is observed from a distance, like those of Prof. Gauss. Prof. Bache explained the mode of adjusting the instrument, and of placing the scale and telescopes.

Mr. Peale remarked, that in the November number of the "London, Edinburgh, and Dublin Philosophical Magazine," there were communications "On the Electricity of a Jet of Steam issuing from a Boiler," and stated that sparks, of the kind mentioned, had been observed in a steam-engine at Wilmington, North Carolina.

Mr. Boyé read a communication, entitled, "On the Perchlorate of the Oxide of Ethule, or Perchloric Ether, by Clark Hare and Martin H. Boyé," which was referred to a Committee.

Professors Rogers and Hare referred to circumstances connected with the discovery, mode of preparing, and preserving this highly explosive compound; of which a specimen, dissolved in alcohol, was presented by M. Boyé to the Society. Dr. Hare, amongst other matters, remarked, that this is the only ether which is explosive, *per se*, when transferred from one vessel to another.

Prof. Bache called the attention of the Society to a diagram

representing the changes of magnetic declination, as recorded at the Magnetic Observatory of Mr. Bond, at Cambridge, and at the Girard College, on the magnetic term day of May, 1840, and showing that the changes attending the aurora are not peculiar to one locality, but that, as observed at different places, they are parts of a great magnetic disturbance.

The two curves thus presented agreed remarkably in all their general features, showing, as a general result, similar motions of the needle at the two places in direction, though not always proportional in amount. They presented remarkable differences in the absolute times at which these movements had taken place at the two stations, the similar movements differing frequently five minutes (with opposite signs), and in a few cases as much as ten minutes in time; in other cases being simultaneous. The period at which the needle had attained, suddenly, its greatest deviation from the true meridian, was ten minutes earlier in absolute time at Cambridge, than at Philadelphia.

Mr. Justice reported, that during the last four or five evenings, he had tested the value of the telescope referred to at a former meeting of the Society (Proceedings, No. 13, p. 276), by observations on the Moon, and stated his opinion of its excellence, as deduced from those observations. Mr. Justice detailed the appearances presented by the Moon's surface through this instrument.

Dr. Demmé referred to the contents of a circular letter from Germany, in which it was stated, that a number of gentlemen of Stuttgart had united, under the name "Societas Bibliophilorum Stuttgartiæ," to publish historical and antiquarian works, which are either out of print, or have never been printed.

The Society at Stuttgart will begin to publish as soon as they have procured five hundred subscribers. The subscription is one pound sterling for which the subscriber will receive one copy: and no more copies will be printed than are subscribed for. The letter to Dr. Demmé, which accompanied it, requested the honour of enrolling the American Philosophical Society amongst the subscribers.

On motion, the Society resolved to subscribe to the undertaking.

Professor Bache read a letter from Major Sabine, giving the progress of the magnetic observations now making, and referring to the modes deemed advisable for the publication of the records of observatories. He referred also to the anomalous nature of the curves for the May term day at Toronto and at Greenwich, and to an instrument for observing vertical force by reflection, in the putting up of which Professor Airy was engaged.

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*Stated Meeting, December* 18.

Present, thirty-eight members.

Mr. Du Ponceau, President, in the Chair.

The following donations were received:—

FOR THE LIBRARY.

Journal Asiatique. 3 Série. Tom. IX. No. 49. Paris. Janvier, 1840.—*From the Society.*

Tijdschrift voor Natuurlijke Geschiedenis en Physiologie; uitgegeven door J. Van der Hoeven, M.D., Prof. te Leiden, en W. H. Vriese, M.D., Prof. te Amsterdam. Zevende Deel. 1ste en 2de Stuk. 8vo. Leiden, 1840.—*From the Editors.*

An Account of the Receipts and Expenditures of the United States, for the Year 1839. 8vo. Washington, 1840.—*From Mr. T. L. Smith, Register of the Treasury.*

A Commercial Dictionary, containing the Present State of Mercantile Law, Practice, and Custom. By Joshua Montefiore, &c. The first American Edition, with very considerable Additions relative to the Laws, Usages, and Practice of the United States. In three Volumes, 8vo. Philadelphia, 1804.—*From Mr. Du Ponceau.*

Sundry Pamphlets, Catalogues, &c., relating to the University of Pennsylvania. 8vo. (Bound.)—*From the same.*

Lettere sull' Indie Orientali. 8vo. Filadelfia, 1802. (2 Vols.)—*From the same.*

Des Crimes de la Presse, considérés comme Générateurs de tous les Autres. Dédié aux Souverains de la Sainte-Alliance. 8vo. Paris. (No date.)—*From the same.*